

# Research on Indigenous Children's Medical Space Design with the Art Therapy— Case Study of Shanghai Children's Medical Center

**Ziying Wang**

Universiti Utara Malaysia(UUM) Sintok 06010, Kedah Darul Aman, Malaysia

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** This essay provides reviews of the development, effect and application practices of the space therapy, from the perspective of design psychology, to sum up current design paradigms of children's medical spaces with non-verbal psychotherapy and rehabilitation landscape theories. This research will use relevant practical examples of Shanghai Children's Medical Center (China) as cases, combining with related questionnaires for design-element detections, based on the contextual process considering geo-cultural element and current interdisciplinary theoretical basis. In order to the innovation of healing space design in China to suit with a develop of global practices, as well as specific issues for nation context.

**Keywords:** Art Therapy; Medical Space; Environmental Design; Therapeutic Land space

**Online publication:** June 26, 2025

## 1. Introduction

This research aims to analysis of medical/healing space design in China, with reviews of current practical examples in hospitals, therapeutic gardens, using theories from non-verbal psychological and rehabilitation, such as the Gestalt Psychology reflect to color stimulus, as well as Design Semiotics of specific design issues and their correspondence to culture contents, with the context of China. Relations between the environment and psychological mechanism will be described as theoretical background in this part, as brief foundations of the research on medical-spaces design specially for Children in China, from aspects in scene design, culture issue and immersion technology which could show particularities for geographical realities.

According to the Blue-book of China's Child Development in 2022, due to social competitions and high pressures form families or schools, children's psychological problems are becoming more serious, about 30 million children under age of 17 in China suffer from various emotional and mental problem especially in first-tier cities, such as Beijing, Shanghai, Guangzhou, etc.<sup>[1]</sup>. Negative emotions brought by long-term illness, like the anxiety, tension and pressure generated in the treatment process become one mist important factors hindering the treatment process of childhood illness<sup>[1]</sup>. As main space students stay during their healing process, hospitals specially for the children always plays an important part in placing sick children and executing therapeutic actions, and hospital spaces with therapy issues was

proved to ameliorate negative emotions caused by children's mental deficiency, mental illness and cancer and other chronic diseases<sup>[2]</sup>. Focusing on the increasingly serious mental problems among Chinese young kids, healing designs for indoor space, especially auxiliary healing space design in the medical scene, has become an important outlet in solving current situations<sup>[3]</sup>.

This research will identify main factors of space designs relevant to principles in visual psychology, reflecting these key issues to the development of children hospital design globally and specially in China, to highlight reasonably practical strategies in improving children hospital space design specially with Chinese context. With survey data about satisfaction in children's hospital in Shanghai, and exploratory case study of Shanghai Children's Medical Center, effectively practical methods of healing space designs could be verified through the analyzing of these evidences, can benefit to future design practices combining with real localized situations.

## **2. Literary review**

### **2.1. Visual perception elements in healing space design**

As for the Gestalt Psychology reflect to color stimulus, as well as Design Semiotics of specific design issues applicated in the healing space design, evidences from previous literatures had clarified that different colors of space decorations could show certain regulating operations on the emotional state of space participants, through stimulating human's visual nerves from the dimensions of hue, lightness and saturation, to bring different visual feelings, especially in medical spaces, reference to researches of Abbas et al.<sup>[4]</sup>. Eriksen's<sup>[5]</sup> practices had reported the participating effects in one specific children's hospital, it was pointed that in the child care unit of traditional hospitals, the smell of disinfectant water, soft fluorescent lighting, monotonous decoration and simple facilities of traditional pediatric hospitals would interfere with the therapeutic effect to a certain extent, most children shows that the decoration of hospitals was not comfortable enough with these particular issues, as the smell of anti-toxic may increase their tension, and the color of fluorescent lamps even interferes with the nurse's judgment of patients' skin condition to a certain extent, while children show their urgent need for soft natural light, green plants, flowers and fruits aroma<sup>[5]</sup>.

Regarding psychological influences of children under medical context, different environment-related healing strategies are applied in the scene and architectural design of children's hospitals<sup>[2]</sup>. In previous application practices, the use of natural factors was considered as one mainstream factor in the design process, according to studies of the garden design of children's hospitals published by Whitehouse et al. in 2001, garden cloisters have been used as important healing scene of auxiliary medicine in European convent hospitals as early as the middle-ages. Based on relevant practical results, American established the Rehabilitation Environment Committee in 1993, which guided the design of the Children's Hospital and the Health Center in San Diego, as part of their rehabilitation plan of Children's Hospital<sup>[2]</sup>.

In China, the medical architectural design study of Urumqi Children's Hospital by Gong and Zhang<sup>[6]</sup>, using specific examples in Urumqi, China, discussed children's psychological needs in healing space with natural features, this hospital established a healing garden on the roof, to increase healing effectiveness of this space, to carry out the localization practice of "de-hospitalization" designs and improve local health services. Similarly, according to Sun's study in 2023<sup>[7]</sup>, it proved examples to emphasize important roles of natural factors, which represented by animal and plant elements to improve children's mental states, that fulfilled specific needs in medical environment from the perspective of children's physiology and psychology .

### **2.2. Cultural elements in healing space design**

In addition to stimuli brought by perceptual elements, other surrounding issues such as vision, touch, smell, etc. under specific environment, spatial design of scenes also required the combination effect of different perceptual elements inside specific environment, as well as considerations of users' cognitive states with specific symbols or elements in different cultures, customs, and regions under geographical factors<sup>[8]</sup>.

It means compared with adults, children's minds are generally considered to be closer to subconscious, due to their imperfect language mechanism and lacks of social experience, many self-defense mechanisms have not formed yet in children's mind, and their thoughts may be closer to real needs of people's subconscious mind, so that during the childhood, children's subconscious mind usually blocks some enlightenment from the conscious mind. The subconscious mind is easily influenced by the narrative plot and makes changes <sup>[9]</sup>. In China, this theory was generally applied in video and drama healing for patients, narrative content that conforms to the psychological characteristics, personality preferences and special cultural patterns of a specific age can usually increase the patient's subconscious level of acceptance of the content, so that they can obtain metaphors or inspiration <sup>[10]</sup>.

### 2.3. Immersion, narrative, and interaction elements in healing space design

Elements of immersion, narrative, and interaction in public spaces could also assist the healing effect in specific environments, especially for public scenes related to children (as children's language mechanism and social cognition are in stages of development, non-verbal interaction would be more conducive to their expression and venting their emotional feelings, especially for their negative emotions) <sup>[11]</sup>.

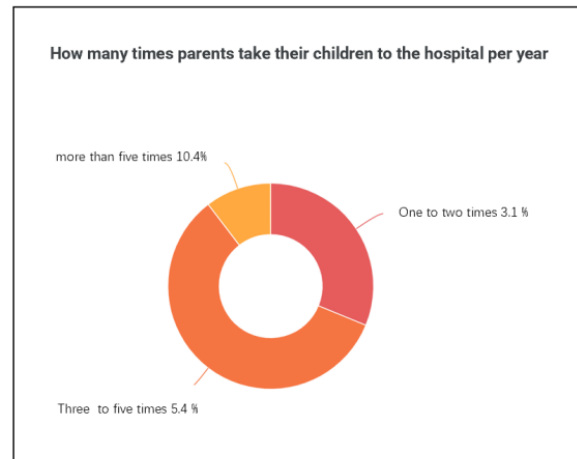
Followed the development of public decoration with multimedia installation and trends of immersive space design based on subjective experience, the interactivity has become a new direction for the development and promotion of new medical models in children's hospitals in China <sup>[12]</sup>. According to the research of interactive designs in children's healing space published by Wang and Zhang <sup>[13]</sup>, current children's medical designs in China are no longer limited to the "static" healing function brought by spatial decoration design, but combine the existing mature interactive media, audio and video equipment, to increase sense in immersion and participation of patients in the space through "dynamic" interactive devices. Thus, extending healing effectiveness in limited medical space, and enhancing individual mental states through the mutual penetration of people and the environment.

Although current practices show developments of healing space design in China, compared with international systematic research on healing models and targeted design improvements based on survey and interview data, relevant Chinese still rely the mature models of the western countries, but lack practical experience combined with the local context, it required specific program designs reference to the psychological situation of teenagers with current domestic context.

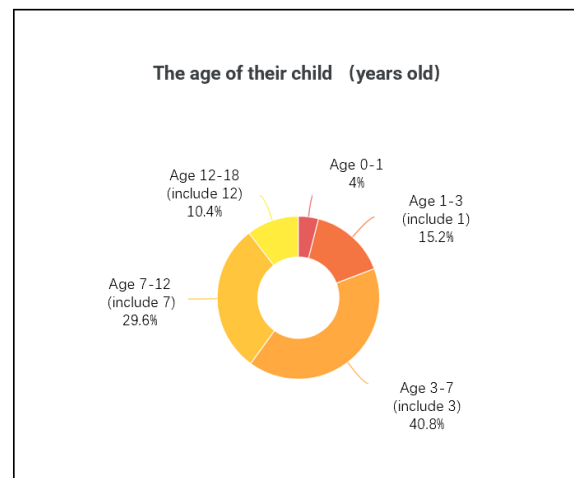
## 3. Methods

In order to contextual analysis about medical design theories in China, reference to previous studies in related area, case study was widely used in space design researches as contextual investigations of popular theory applied theories. Design with therapy functions can be identified as multi-discipline spheres involved psychology, design, ethnography, etc. which required detailed examinations of a specific individual, group, organization, or event, to deeper understandings for specific interdisciplinary practices with multiple elements <sup>[9]</sup>. Besides, case study in this research in qualitative kind can make healing design hypothesis be reflected in real-world settings, making relevant and applicable to practical situations, to help with the verification of previous hypothesis, as well as offer valuable insights into complex real-life situations.

In order to support analysis of Shanghai Children's Medical Center, this research choose random sampling survey (the online kind) for 125 parents in Shanghai, with kids from 0 to 18 years old, to investigate their attitude of the visual, cultural and interaction issues which we have concluded from previous studies about effective healing space designs. This survey involved 5 samples whose student is younger than 1 years old (5%), 19 samples (15.2%) for 1 to 3 years (include one year old), 51 (40.8%) of them are from 3 to 7 years old (include three years old), and 37(29.6%) of them, are 7 to 12 years old (include seven years old), the rest are between 12 (include 12) to 18 years old, for about 10%, and their detailed hospitalized conditions will be showed in the **Figure 1**.



**Figure 1.** Survey results about the times parents send their children to hospital per year



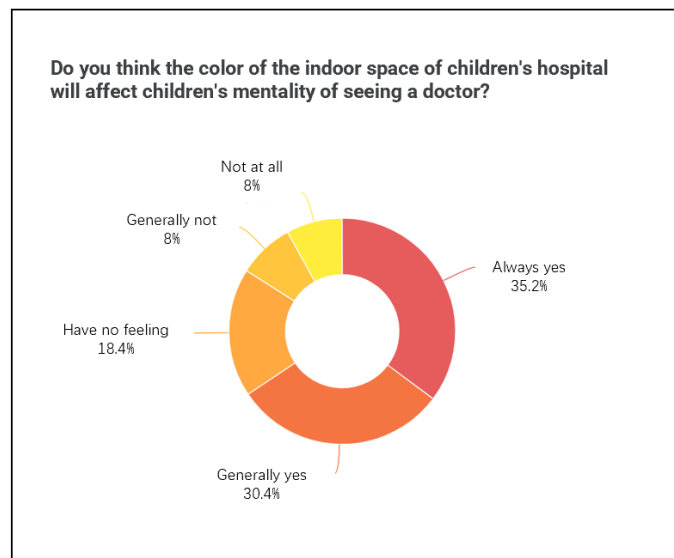
**Figure 2.** Survey results about the age of samples' child.

## 4. Results

### 4.1. Scene design: visual and natural factors

Similar to the problems faced by many urban medical institutions in China, the reconstruction and planning of Shanghai Children's Medical Center, which is located on Dongfang Road in Pudong New Area, Shanghai, needs to face the problems of high demand for green activity area and urban crowding. According to the architectural scheme of the medical complex building of Shanghai Children's Medical Center, the building added cross space levels between indoor and outdoor on the basis of the original public activity space by means of the first-floor elevation, the roof greening of the podium, and the sinking courtyard. The roof garden and waiting room were designed at the connection of different floors between different buildings to form a three-dimensional green healing space. The design not only extends the greenery of the building environment, but also adds natural views to the interior Windows.

According to the result of the questionnaire survey, 60% of the respondents believe that the comfort of the hospital environment is one main reason they choose Shanghai Children's Medical Center, and over 65% of them show their approvals of the question: "Do you think the color of the indoor space of children's hospital will affect children's mentality of seeing a doctor?", it means that Shanghai residents had a wide range of cognition on the efficacy of environment therapy, and affirmed the functions of natural elements in the living environment to enhance body function.



**Figure 3.** Survey results about “Do you think the color of the indoor space of children’s hospital will affect children’s mentality of seeing a doctor” among 125 Shanghai respondents.

According to Dalke et al.’s study<sup>[14]</sup> on hospital decorations, colored rooms with balanced tension such as yellow and green could provide visual stimulation to patients to a certain extent, especially helping patients with mobility problems to shift their attention to more creative imagination in a fixed space, and high-saturation medical space can increase patients’ anxiety and make them feel visually agitated. Compared with simple white space, low-saturation space with warm colors such as beige, orange or yellow is more conducive to promoting physical activity, improving patients’ sense of security, and creating a friendly and trustworthy medical atmosphere<sup>[14]</sup>. In Shanghai Children’s Medical Center, the design of the public areas in the healing building is mainly beige and wood grain, facade pattern adopts tangram elements that are widely known to children, colorful geometric figures run through the internal space, together with the three-dimensional installation of plant elements, the cartoon hand-painted wall and the animal guide logos. That may be main reasons why people feel more comfort and children-friendly in this hospital space.

#### 4.2. Cultural characteristics: Children’s narrative preferences

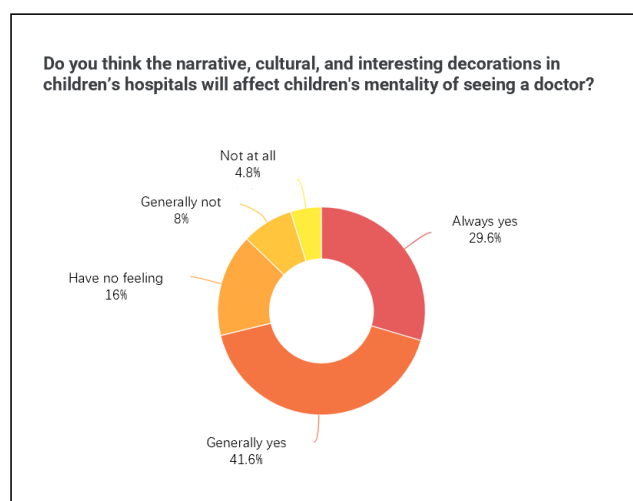
According to a five-month survey conducted by the Paper from October 2022 to March 2023, in nearly half a year since the launch of the “no crying” Marine theme operating room in Shanghai Children’s Medical Center, the preoperative cooperation of children increased from 63.2% to 89.5%, the incidence of crying noise decreased from 36.8% to 10.2%, and patient total satisfaction increased from 68.8% to 96.7%. The operating room is located on the second floor of the old outpatient building of the medical center, covering an area of 155 square meters which was divided into three parts: the entrance corridor, the waiting area for family members and the medical service station, the “beacon of hope in the ocean” has become the narrative theme throughout all the Spaces. In order to effectively relieve children’s anxiety, increase their preoperative cooperation and postoperative trauma recovery, the theme operating room in cooperation with Shanghai Institute of Visual Arts combines the curiosity and cognitive characteristics of Shanghai children for coastal culture and ocean exploration, and transforms the reception desk at the entrance of the area from the traditional operating desk to the image of a “pirate ship”; the front door of the operating room also adopts the design of “lighthouse door” combined with the ocean narrative to give the children a psychological feeling of safety and hope; the story plot of “ocean journey” is continued in the operating room, and the theme design of sunshine, rainbow and beach is used; in addition, the use of touch sensing rainbow light can largely shift the attention of children, so as to improve the preoperative anxiety and fear of patients<sup>[15]</sup>.

Cooperated with the overall theme narrative of the children space decorations, the hospital placed cartoon picture

books related to Marine life and fantasy stories suitable for all ages in the preoperative waiting area to help children shift their attention to the Marine theme, so as to immerse themselves in the fantasy, calm and security brought by the Marine theme. Through this attempt, the patient activity room project of Shanghai Children's Medical Center continues the environmental narrative design that meets the cognitive needs of children, the project consists of five floors spanning the children's ward, aiming to provide a waiting, rest and enriched space for hospitalized children and accompanying parents. For orthopedic children with chronic diseases and mobility problems who need long-term hospitalization, their five-floor activity space was created into five theme environments of different ecological circles, including space, forest, river, desert, etc., and with the wall decoration and color style, the sofa, bookshelf and light decoration mimicking the natural environment were matching, it can improve the immersion of children and stimulate their nature of exploration and curiosity.

### Medical Center

Aiming to these design concepts in Shanghai Children's Medical Center, survey in random kind among 125 Shanghai parents with young kids in this research, shows that over 70% of the respondents agree that the narrative, cultural and story-oriented elements in children hospital's decorations, like the activity room and operating room in Shanghai Children's Medical Center, can effectively improve children's cooperations when seeing doctors, and can benefit to their psychological conditions in courses of the treatment.



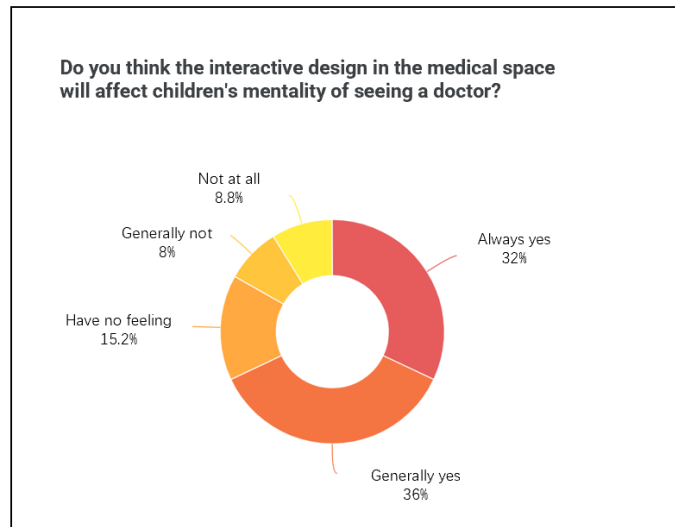
**Figure 4.** Survey results about “Do you think the narrative, cultural, and interesting decorations in children’s hospitals will affect children’s mentality of seeing a doctor?” among 125 Shanghai respondents.

### 4.3. Immersion/interactivity: Interactive design in medical space

Interactive art installations in children's hospitals mainly rely on designers, who build specific carriers and accommodate joint intervention of users and the environment, to realize the active or passive participation of participants and obtain certain feedback <sup>[16]</sup>. For example, Cabrini Hospital in Australia, the interactive art wall designed with light and shadow as the carrier to realize action awakening, when children pass by, they can sense the position and movement of children and give feedback through the light and shadow of natural scenery such as rainbow and flower to give children an immersive natural experience <sup>[17]</sup>. In recent years, there are few interactive devices in Shanghai Children's Medical Center, such as a Marine life observation window on the first floor of the old outpatient center, and observation windows are designed according to the different heights of children and parents, it serves as a narrative extension of the Marine theme operating room, and can increase the interaction and communication between children and parents through the way of parent-child observation of animals, to improve the cooperation of children and relieve the tension of family members.

Reference to related analysis and practical experiences, through the survey of Shanghai Children's Medical

Center, 62.4% of the respondents see the interactive children area as the important facilities in the hospital design, in meeting the social needs of their children during medical visits, besides, over 65% parents highlight the necessity of the interactive design in healing spaces in improving their children's psychology states during the treatment, and easing their tension and pressures that constantly plagued with illness. These data can be seen as supporting evidence in processing interactive designs in Chinese medical institutions.



**Figure 5.** Survey results about “Do you think the interactive design in the medical space will affect children’s mentality of seeing a doctor?” among 125 Shanghai respondents.

## 5. Conclusion

With popularizations of innovative medical model among children’s healing spaces, following a development of medical design practices, transformation from traditional medical space to healing space is realized through specific designs of color, lights, natural system, and narrative-theme functional scenes. localized and innovative space design concept for children’s hospital has gradually become a future trend of contemporary children’s medical system. Examples in Shanghai Children’s Medical Center shows the design of domestic children’s medical space is gradually getting rid of the inherent context of western contemporary medical environment models, and realizing a localized evolution of design concepts with local children’s behavioral habits and cultural tendencies.

Nevertheless, space design facing the will of specific groups is still a serious and complex proposition, which requires a lot of practical data accumulation and design concept application. While the reference of graphic design elements corresponding to the psychological mechanism also needs to be localized rather than simply appropriated. At present, there are still some problems in the design of therapeutic children’s medical space in China, such as insufficient theoretical localization, weak science and technology and interaction, and lack of interdisciplinary research. Through the avant-garde design practice of Shanghai Children’s Medical Center, this study aims to explore the possibility of localization of natural healing (garden healing), cultural narrative healing and interactive project healing practice in the current domestic children’s medical scene, and to provide theoretical experience with reference values for the development of space designing.

## Disclosure statement

The author declares no conflict of interest.



## References

- [1] Min L, 2022, Blue Book of Children: Annual Report on Chinese Children's Development. China City Planning Review, 31(4), 86-86.
- [2] Kim M, 2016, Interview I: Mikyoung Kim Design. In Innovations in Landscape Architecture . Routledge, 239-245.
- [3] Liu Y., & Zheng, B, 2022, Research on healing-oriented space design in the post-epidemic era. Fashion color, 9, 107–109. <https://xueshu.baidu.com/usercenter/paper/show?paperid=1a170t40k24j0gy0ue4f06q0kf591993>
- [4] Abbas N, Kumar D, McLachlan N, 2006, The psychological and physiological effects of light and colour on space users. In 2005 IEEE Engineering in Medicine and Biology 27th Annual Conference. IEEE, 1228-1231.
- [5] Eriksen A, 2000, Participatory planning and design of a new children's hospital. Melbourne: Design & Health-The Therapeutic Benefits of Design, 42(5), 65-71.
- [6] Gong X, Zhang X, 2019, The application of environmental psychology in the design of medical buildings——Take the design practice of Urumqi Children's Hospital as an example. China Hospital Architecture and Equipment, 11(1), 24-27.
- [7] Sun Q, 2023, Research on soft decoration design of children's hospital wards under the concept of emotion. Shanxi Architecture, 49(3), 182-185.
- [8] Day C, 2017, Places of the soul: Architecture and environmental design as a healing art. Routledge.
- [9] Cozolino L. J, Santos, E. N, 2014, Why we need therapy—and why it works: A neuroscientific perspective. Smith College Studies in Social Work, 84(2-3), 157-177.
- [10] Zhang A, 2008, Watching Movies Heals the Mind——Application of Movies in Psychological *Counseling and Therapy*. (Doctoral dissertation, East China Normal University).
- [11] Wang QY, Li DM, 2016, Advances in art therapy for patients with dementia. Chinese *Nursing Research*, 3(3), 105-108.
- [12] Migdal J. S, 2018, The state in society. In New directions in comparative politics. Routledge, 63-79.
- [13] Wang H, Zhang, T, 2019, New Trends of Space Interactive Public Art Design for Children's Healing Environment. Public Art, 1-6.
- [14] Dalke H, Little J, Niemann E, Camgoz N, et al., 2006, Colour and lighting in hospital design. Optics & Laser Technology, 38(4-6), 343-365.
- [15] Razowski S, 2016, The Walt Disney Company fait un don au Shanghai Children's Medical Center. Disney: Toute l'Actualité Des Films et de Disneyland Paris. <https://radiodisneyclub.fr/walt-disney-company-aire-jeu-hopitaux-chinois/>
- [16] Roberts-Smith J, Ruecker S, Radzikowska M, 2021, Prototyping Across the *Disciplines: Designing Better Futures*. Intellect Books.
- [17] Babl F. E, Tavender E, Ballard D. W, et al., Paediatric Research in Emergency Departments International Collaborative (PREDICT), Australian and New Zealand guideline for mild to moderate head injuries in children. Emergency Medicine Australasia, 33(2), 214-231.

### Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.